Oral Conditions, Occlusal Pairs, and Masticatory Function of Institutionalized Older People in Cali Colombia, 2019 *

Condiciones bucodentales, pares oclusales y función masticatoria de personas mayores institucionalizadas en Cali Colombia, 2019

Condições bucais, pares oclusais e função mastigatória de idosos institucionalizados em Cali Colômbia, 2019

DOI: https://doi.org/10.11144/Javeriana.uo41.ocop

María Alejandra Ordóñez Realpe
Universidad del Valle. Cali, Colombia
alejaburbu7@gmail.com
ORCID: https://orcid.org/0000-0002-1822-3988

Carlos Andrés Benavidez Palacios
Universidad del Valle, Colombia
carlos.benavides@correounivalle.edu.co
ORCID: https://orcid.org/0000-0002-0765-263X

Christian Yesid Gómez Córdoba
Universidad del Valle, Colombia
christian.gomez.cordoba@correounivalle.edu.co
ORCID: https://orcid.org/0000-0003-1584-3003

María Teresa Calzada Gutiérrez
Universidad del Valle, Colombia
maria.t.calzada@correounivalle.edu.co
ORCID: https://orcid.org/0000-0002-6534-909X

Bruno Gutiérrez Quiceno
Universidad del Valle, Colombia
gutierrez.bruno@correounivalle.edu.co
ORCID: https://orcid.org/0000-0001-8949-7647

Received: 07 june 2022
Accepted: 17 october 2022
Published: 31 december 2022

Abstract:

Background: There is an increase in the population of older adults in the world, which turns this group into a main target for public health and, in general, for health sciences. Purpose: To characterize the oral conditions of the older residents in a geriatric care site in Cali, Colombia, year 2019. Methods: A descriptive study with an observational, cross-sectional design about the oral health status of 97 patients who lived in a geriatric care facility was conducted. The data collected from each participant included sociodemographic information, as well as presence of edentulous areas, occlusal pairs, use of dental prostheses, soft tissue injuries, root caries, and oral hygiene. Prior to the assessment, observers' calibration was measured with the Cohen's Kappa Index. Data underwent descriptive and inferential analysis (Kruskal Wallis' H test, with p= 0.05). Results: The population of institutionalized adults included in this study presented an average of 8 occlusal pairs. Likewise, 70 % of the participants had no occlusal pairs and a diminished masticatory function, Thirty nine percent of them did not have a functional dentition and there was a total absence of functionality among 25 %. All the patients presented edentulous areas with there was a high prevalence of complete edentulism. Conclusions: Understanding oral health differences from a public health perspective and generating interventions based on the primary health care perspective is key to improving the oral status of institutionalized older adults.

Keywords: Cali, Colombia, dental care for the elder, dental prosthetics, dental public health, dentistry, edentulous arch, elder, geriatric dentistry, gerodontology, health of the elder, occlusal pairs, oral diseases, oral health, root cavity, soft tissue injuries, toothless mouth.

Resumen:

Antecedentes: Existe un aumento de población de adultos mayores en el mundo, lo cual convierte dicho grupo poblacional en un objetivo principal para la salud pública y, en general, para las ciencias de la salud. Objetivo: Caracterizar las condiciones bucodentales de las personas mayores de un sitio de cuidado geriátrico en Cali, Colombia, año 2019. Métodos: Se llevó a cabo

un estudio descriptivo con un diseño observacional de corte transversal sobre las condiciones bucodentales de 97 residentes en un sitio de cuidado geriátrico. Se obtuvo información sobre aspectos sociodemográficos, presencia de zonas edéntulas, pares oclusales, uso de prótesis dental, lesiones de tejidos blandos, caries radicular e higiene oral de cada adulto mayor. Antes de la evaluación se realizó una calibración de los observadores que se estimó mediante el índice kappa de Cohen. Los datos recolectados se analizaron descriptiva e inferencialmente mediante la prueba H de Kruskal Wallis (p = 0.05). Resultados: La población de adultos institucionalizados incluidos en el estudio presentó en promedio 8 pares oclusales. Asimismo, 70 % de los participantes no tenía ningún par oclusal y presentaba una función masticatoria disminuida. Treinta y nueve por ciento no tenía una dentición funcional y en cerca de un 25 % había ausencia total de funcionalidad. Todas las personas presentaban zonas edéntulas con una alta prevalencia de edentulismo completo. Conclusiones: Entender las diferencias de salud bucodental desde la salud pública y generar intervenciones fundamentadas en la atención primaria en salud es clave para mejorar las condiciones orales de los adultos mayores institucionalizados.

Palabras clave: anciano, atención odontológica al anciano, arcada edéntula, boca desdentada, Cali, Colombia, caries radicular, enfermedades bucales, gerodontología, lesiones tejidos blandos, odontología, odontología geriátrica, pares oclusales, prótesis dental, salud bucal, salud del anciano, salud pública bucal.

Resumo:

Antecedentes: Há um aumento na população de idosos no mundo, o que torna esse grupo um alvo principal para a saúde pública e, em geral, para as ciências da saúde. Objetivo: Caracterizar as condições bucais dos idosos residentes em um centro de assistência geriátrica em Cali, Colômbia, ano 2019. Métodos: Foi realizado um estudo descritivo com delineamento observacional e transversal sobre o estado de saúde bucal de 97 pacientes que viviam em uma unidade de assistência geriátrica. Os dados coletados de cada participante incluíram informações sociodemográficas, bem como presença de áreas desdentadas, pares oclusais, uso de próteses dentárias, lesões de tecidos moles, cáries radiculares e higiene bucal. Antes da avaliação, a calibração dos observadores foi medida com o Índice Kappa de Cohen. Os dados foram submetidos a análise descritiva e inferencial (teste H de Kruskal Wallis, com p = 0,05). Resultados: A população de adultos institucionalizados incluída neste estudo apresentou uma média de 8 pares oclusais. Da mesma forma, 70 % dos participantes não tinham pares oclusais e uma função mastigatória diminuída. Trinta e nove por cento deles não tinham uma dentição funcional e houve uma ausência total de funcionalidade entre 25 %. Todos os pacientes apresentaram áreas desdentadas com alta prevalência de edentulismo completo. Conclusões: Compreender as diferenças entre a saúde bucal e a saúde pública e gerar intervenções baseadas na atenção primária à saúde é fundamental para melhorar as condições bucais dos idosos institucionalizados.

Palavras-chave: assistência odontológica para idosos, arco edêntulo, boca desdentada, Cáli, Colômbia, cárie radicular, doenças bucais, gerodontologia, idoso, lesões de tecidos moles, odontologia, odontologia geriátrica, pares oclusais, prótese dental, saúde bucal, saúde bucal pública, saúde do idoso.

INTRODUCTION

The world population is aging, and most countries are experiencing an increase in the percentage of older people (1). Projections estimate that between 2020 and 2030, the percentage of the planet's inhabitants over the age of 60 will increase by 34 %. By the end of this decade, one in six people in the world will be over the age of 60, which is an increase from 1 billion to 1.4 billion. In the year 2050, the world population of people in this age group will be doubled (2.1 billion). In addition, a longer life expectancy is expected, which means that the number of people aged 80 or older will triple between 2020 and 2050, reaching approximately 426 million (2).

The Latin American region is no stranger to this global phenomenon. Accelerated aging is attributed to causes such as fast population growth, rapid urbanization, decreasing fertility rates, and increased expectation of life at birth. People aged 75 and over is the expected age group to grow the fastest, doubling in the next 50 years (3). In Colombia in 2018, the older adult population was round 13% (4). It is estimated that by 2030 the older population will grow to 9.74 million people, that is, it will represent 17.5 % of the total population of the country. Life expectancy has increased by an average of 28.4 years in just one hundred years (5).

Population aging is about to become one of the most significant social transformations of the twenty first century with consequences for almost all sectors of society, including labor and financial markets and demand for goods and services. Likewise, family structure and intergenerational ties will be impacted by

aging. Furthermore, public policy has established that the general conditions of aging should be addressed towards healthy aging in the 2020-2030 decade (6).

The growth in older people with social and health care needs has generated an exponential increase in care institutions for seniors. Such institutions have moved from being sites for room and board while covering basic needs to become sophisticated centers that serve users with or without multifaceted needs. In some cases, those needs derive from conditions of disability with some independency to functional deterioration. They could include recovery from illness and/or hospitalization, comorbidity, geriatric syndromes, dementia, hip fractures, cerebrovascular accidents, and edentulism (7). Senior care facilities provide a wide range of services and often provide important information, referrals and play focal point roles (8,9).

There are around 1200 social protection centers or long-term facilities for elders in Colombia. They provide services to 120,000 senior citizens and hire nearly 55,000 staff members, including health care workers who are in charge of health care, promotion, and prevention. These type of centers have a social nature and have not been created to provide health care services, for the most part. The care and service centers for seniors in the country are subject to quality regulations and guidelines from the Ministry of Health, including Law No. 790 of 2002, Decree No. 205 of 2003, and bulletin No. 0028 of 2013 (10).

Population aging and the emergence of geriatric care sites have implications for the aging process. Regarding health, the mouth experiences changes in oral tissues, structures, and functions, such as increasing the tooth loss due to periodontal disease, caries, and oral mucosa lesions (11-13). Those conditions, the lack of teeth, the absence of dental prosthesis and the alteration of masticatory function could produce changes in systemic conditions, including nutrition (14). A person's fulfilling of aspirations and personal acceptance are also affected by aging because of feelings of shame, low self-esteem, pain, and discomfort when they are surrounded by other people during mealtimes and socialization moments. This sort of situation has been a matter of concern for the oral health-related quality of life (15). Some approaches have shown the positive impact that good oral health programs have on the quality of life of older adults when they reside in geriatric care settings. There is no doubt that it could have a protective effect on the perception of oral quality of life (16).

Some characterizations have been described in Latin American literature regarding the oral health conditions of institutionalized patients. For instance, in Cuban senior care center, researchers found that regarding wearing dentures, 78.5 % of seniors suffered from lesions associated with the prosthesis. Likewise, 95.8% had deteriorated dentures, and all of the patients wore their prostheses for 21 years or more (17). In Venezuela, a report of a senior care facility with institutionalized adults reported that 61.87 % patients suffered from dental caries and 60.43 % had gum lesions (18). Previous descriptions in Colombia show a large problem with 48.5 % of the population being completely edentulous, 85.7 % experiencing dental caries, and 74.1 % having a high risk of oral disease as estimated through the bacterial plaque index. To date, oral health trends among institutionalized population in the city of Cali have not been widely studied (19).

Currently and at the time of review of literature for this study, there were limited oral status depictions of senior patients living in care facilities in Colombia. There are population-scope studies about oral health conditions among older adults (20,21), both from clinical examinations and self-reported data. However, there are few reports on institutionalized senior patients. Some studies have focused on quality of life (15,22), while others looked at specific characteristics (19). Yet, none of them has assessed occlusal pairs and masticatory function, an aspect that is essential for an adequate masticatory process. By documenting the oral health status of this specific population will provide adequate information for public health policy and institutional actions. It is expected that the institutionalization of patients serves as a protective factor against unfavorable oral health conditions, in addition to giving clear guidelines to health care workers on the conditions of this group of population. It will allow us to consolidate plans and programs. Based on the previous statement, this study aimed at performing a comprehensive assessment of dental conditions,

occlusal pairs, masticatory function, use of dental prostheses, and soft tissues among older adults who are institutionalized in a senior care center in Cali, Colombia, in 2019.

MATERIALS AND METHODS

A descriptive, cross-sectional study was conducted at the Hospital Geriátrico y Ancianato San Miguel (HGASM) in the city of Cali, a first-level state-owned social enterprise that offers shelter, hospitalization, and low-complexity health care services to elderly population in southwestern Colombia. HGASM provides nursing care, dental services, general and integrative medicine, and geriatrics, complemented by an interdisciplinary service in gerontology, physiotherapy, respiratory therapy, nutrition, speech therapy, and psychology. HGASM serves as a day center, halfway house, and residence for approximately 280 vulnerable older people, who are assigned to different rooms based on category in the system (i.e., affiliated and subsidized), physical and health condition, degree of functionality, and independence.

The population of HGASM consisted of 280 patients of whom 180 were not eligible to participate in the study due to their mental health status or the difficulty to conduct the clinical examination. This was determined by recommendations from the institution's nursing staff. Exclusion of those patients was recorded in a form that described the specific reasons for the exclusion. One hundred patients were the study population, who responded to general questions and underwent a complete oral clinical examination. Data from three patients was not included or analyzed because there was no information on their age (inclusion criterion). The sample of study consisted of data from 97 valid records. This sample size was considered representative of the entire population (95 % confidence and beta error = 8 %).

This project was approved by the Ethics Committee of the Universidad del Valle (CIREH-UV No. 008-19) and the senior care facility. A theoretical and practical calibration was performed to the examiners, including gerontological aspects and diagnostic accuracy/coincidence of the entire oral cavity. The Kappa coefficient was calculated (> 0.8) and accepted for examiners. The calibration process included comparisons with the gold standard who were the principal researchers. Data from three patients were collected and assessed with a collection instrument by a gold standards and one of the examiners. In addition, a pilot test of 10 older adults was performed before the collection of the sample clinical data. After the pilot test, the collection instrument was revised and adjusted. Data collection was conducted using that form, and participants signed an informed consent form to be part of the study. The Kappa average among examiners was > 0.85, which was accepted as an adequate competence to collect information for the study (26).

The form comprised information on sociodemographic variables, attendance to a dental care service (i.e., senior facility, private, or health promoting entity), clinical history, and dental assessment. The oral clinical examination of each patient took 20 minutes, whose information was included in an instrument based largely on the variables of the Fourth National Oral Health Study (ENSAB IV) for older population (20) and included some key content for the institutionalized population.

Oral Assessment

A standardized protocol was followed, which included systematic inspection of the dental, soft tissue, and prosthetic status through direct vision. The clinical examinations were performed using sterile basic instruments (mirror and explorer) packed in individual bags and glasses with led light with equal intensity to facilitate the visualizations and standardizations. The data were directly collected at the senior care center.

Edentulism

Initially, we assessed the presence of total edentulism. Regarding partial edentulousness, we used the Edward Kennedy classification of 1925, which looks at the upper and lower arch topography. The classification assesses the relationship between edentulous zones with respect to the remaining teeth and assigns four possible categories: class I, bilateral edentulous areas located distal to the remaining teeth; class II, unilateral edentulous area located distal to the remaining natural teeth; class III, unilateral edentulous area with natural teeth on each side of it; and class IV, simple or unique and bilateral edentulous area located before the remaining natural teeth, crossing the midline (23).

Dental Exam

We assessed teeth that were clearly visible in the oral cavity. We did not count as teeth impacted root remains, implants without crown restoration, or fixed prostheses. Abutments were counted as teeth though. The records of each participant included a complete dental chart, registration of number, and upper and lower tooth position; presence and severity of root caries based on visual examination using the International Caries Detection and Assessment (ICDAS) system. The latter uses codes for classification of dental caries: E, shows that the surface is not exposed to the examination; 0, the root surface does not show any unusual coloration; 1, there is a clearly demarcated area on the root surface or at the cement-enamel junction (CEJ), but no cavity is present; and 2, there is a clearly delimited area on the surface of the root or in the CEJ and there is a loss of anatomical contour greater than 0.5 mm (24).

In the case of upper and/or lower prostheses, documented information included use, type of prosthesis (i.e., total removable, total fixed, partial removable, partial fixed, and implants with coronal rehabilitation), length of time prosthesis have been worn, and moment and length of daily wearing time. Regarding for removable dentures (partial and total), information collected comprised use or not of prosthetic adhesives and length of time dentures have been worn. To complete the dental and prosthetic classifications, we examined the function of occlusal pairs (opposing teeth in occlusion), that is, equivalence with findings registered in the oral cavity and relationship between upper and lower dental hemiarches. Records were registered on a diagram containing the number and position of structures involved. The pairs were classified included pairs of natural and/or prosthetic teeth.

The assessment of soft tissues comprised inquiry about the perception of xerostomia (dry mouth) and oral examination to identify lesions associated with the use of removable prostheses, such as traumatic ulcers and hyperplasia defined as growth or abnormal inflammation of the mucosa (20,21). In addition, the presence of subprosthetic stomatitis was reported when there was inflammation of the supporting mucosa of a prosthesis, according to Newton's classification: I, reddish dots on the mucosa; II, hyperemia; elevation and mucosal atrophy; and III, nodular or granular appearance that does not disappear (25). Regarding dental, soft tissue, and prosthetic hygiene, information was obtained on the practice or not of oral hygiene, the frequency, and use of dental cleaning items.

The Stata 14 software was used for the statistical analysis, considering types of variables, central tendency and dispersion measures for descriptive analysis. In some cases, the Kruskal-Wallis test was conducted to determine if there were significant differences in relation to the variables sex.

RESULTS

Demographic Variables

Regarding demographic variables, 34 % participants were women and 66 % were men. Around 60 % of the participants did not complete schools school, 11 % obtained college education being one of them considered as having professional credentials. In terms of health insurance, 90 % of the participants were covered by the subsidized system and 10 % belonged to the contributory system. Four participants received a pension, which means that more than 90 % received government subsidies. Concerning the utilization of dental care services, 46 % of the patients received dental care at the senior care facility while 48 % do not use any service. Table 1 summarizes the sociodemographic findings of the population assessed. The table shows differences by gender and statistically significant differences regarding the other variables. In this study, the Kruskal Wallis test did not show statistical differences between men and women.

TABLE 1
Sociodemographic Characteristics of Participants. San Miguel Geriatric Hospital and Nursing Home, 2019

Variable	Indicators	Sex		P
		Men	Women	
Age/Years	60-69	16	2	0.28**
	70-79	16	14	
	80-89	26	12	
	90 and older	6	5	
Skin color	Light	45	23	0.90**
	Medium	19	9	
	Dark	0	1	
Time in the Institution	Less than one year	11	6	0.95**
	1-4 years	43	18	
	5 years and more	7	4	

** Kruskal Wallis test
Source: the authors.

Table 2 describes the oral health conditions of the participants in the study. All of them presented edentulous areas. The statistical test showed significant differences by gender regarding oral hygiene and all prosthetic variables.

In addition to the findings listed in Table 2, 55 patients wore some type of prosthesis, either upper, lower, or both, while 42 did not use prostheses. Regarding oral hygiene items, the participants mostly used a toothbrush and toothpaste. Only 3 % of the participants presented xerostomia.

Additional findings about the participants who wore removable prostheses showed that most of them reported wearing it all the time and a small percentage reported wearing it occasionally. Furthermore, 90 % of the patients used a toothbrush and toothpaste to clean the prostheses and a small percentage, less than 10 %, also used baking soda for the cleaning.

Regarding the use of the dental adhesive for the prostheses, only one person reported using it in the upper and lower maxillae.

TABLE 2
Oral Health Characteristics of Participants San Miguel geriatric hospital and nursing home, 2019

Variable	Indicator	Sex. n(percentage)		P
		Male	Female	
Oral hygiene-times per day	1	19 (29.69)	4 (12.12)	>0.05**
	2	24 (37.50)	18 (54.55)	
	3	21 (32.81)	11 (33.33)	
Number of upper teeth	None	29 (45.31)	9 (27.27)	0.07**
	1-5	22 (34.38)	17 (51.52)	
	6-10	6 (9.38)	5 (15.15)	
	10 or more	7 (10.94)	2 (6.06)	
Number of lower teeth	None	23 (35.94)	6 (18.18)	0.09**
	0-5	22 (34.38)	15 (45.45)	
	6-10	14 (21.88)	10 (30.30)	
	>10	5 (7.81)	2 (6.06)	
Type of upper prosthesis	Removable partial	9 (14.06)	8 (24.24)	0,03**
	Full, Removable	22 (34.38)	16 (48.48)	
	Does not use	33 (51.56)	9 (27.27)	
Type of lower prosthesis	Removable partial	11 (17.19)	3 (9.09)	>0.05**
	Full, Removable	12 (18.75)	6 (18.18)	
	Does not use	41 (64.06)	24 (72.73)	
Years wearing prosthesis	< 1	11 (33.33)	1 (4.55)	>0.05**
	1-5	15 (45.45)	14 (63.64)	
	6-10	7 (21.21)	7 (31.82)	
Wearing prosthesis	Daytime	20 (57.14)	14 (58.33)	>0.05**
	Day and night	14 (40.00)	10 (41.67)	
	Only to eat	1 (2.86)	0 (0.00)	
Upper denture hygiene times per day	1	7 (22.58)	1 (4.17)	>0.05**
	2	12 (38.71)	14 (58.33)	
	3	12 (38.71)	9 (37.50)	
Lower denture hygiene times per day	1	7 (28.00)	0 (0.00)	>0.05**
	2	10 (40.00)	6 (66.67)	
	3	8 (32.00)	3 (33.33)	

** Kruskal Wallis test
Source: the authors.

Chewing Functionality

The World Health Organization (WHO) defines that a person has a masticatory functionality when there are more than 20 teeth in the mouth. This study found that 27 % of the participants had a more-than-satisfactory functionality, 9 % presented minimal masticatory function, 39% had non-functional dentition, and 25 % presented total absence of functionality.

Table 3 shows the classification of the edentulous arches. None of the patients had full dentitions. On the other hand, most of the residents of the care facility were Angle Class I of Angle in the lower arch or completely edentulous in the upper arch.

TABLE 3
Classification of Edentulous Arches San Miguel Geriatric Hospital and Nursing Home, 2019

Angle classification	Upper arch. n(percentage)	Lower arch. n(percentage)
Class I	28 (28.87)	45 (46.39)
Class II unilateral	3 (3.09)	7 (7.22
Class III bilateral	3 (3.09)	2 (2.06)
Class III	8 (8.25)	7 (7.22)
Class IV	4 (4.12)	1 (1.03)
Edentulous	51(52.58)	35 (36.08)

Source: the authors.

Soft Tissues

We found tissue overgrowth caused by upper prostheses in 20 % of the participants. There was no tissue overgrowth in of the lower arches.

Traumatic ulcers due to prosthesis were present in three percent of the participants' upper arches. No lesions of this type were present in the lower arch. Finally, we also assessed the presence of subprosthetic stomatitis, finding that 23 % of the participants had it in both the upper and lower arches. When differentiating by dental arch, stomatitis was slightly higher in the upper than in the lower arch. There were no findings of class III stomatitis (Table 4).

TABLE 4
Description Denture Stomatitis

Classification	Upper dental prosthesis	Lower dental prosthesis
Class I	12 (12.37)	6 (6,19)
Class II	10 (10,31)	2 (2,06)

Source: the authors.

Root Caries

Root caries was assessed through the examination of surfaces in the teeth present, using the ICDAS criteria. Forty five percent of the patients presented root caries, among whom 20 % had between 1 and 2 grade I lesions and 17% had between 1 and 2 grade 2 lesions. The prevalence of root caries was high.

Occlusal Pairs

A low average of occlusal pairs was found. In general, the participants presented eight occlusal pairs on average. Seventy percent of the teeth present did not have occlusal pairs. In the case of tooth-to-prosthesis pairs, 72 % did not have any pairs and finally, while in the case of prosthesis-to-prosthesis 73 % did not have any occlusal pairs. The average number of occlusal pairs by age is shown in the Figure 1. It can be appreciated that as age increases, the tooth-to-tooth occlusal pairs decrease, while denture-to-prosthesis pairs tend to increase.

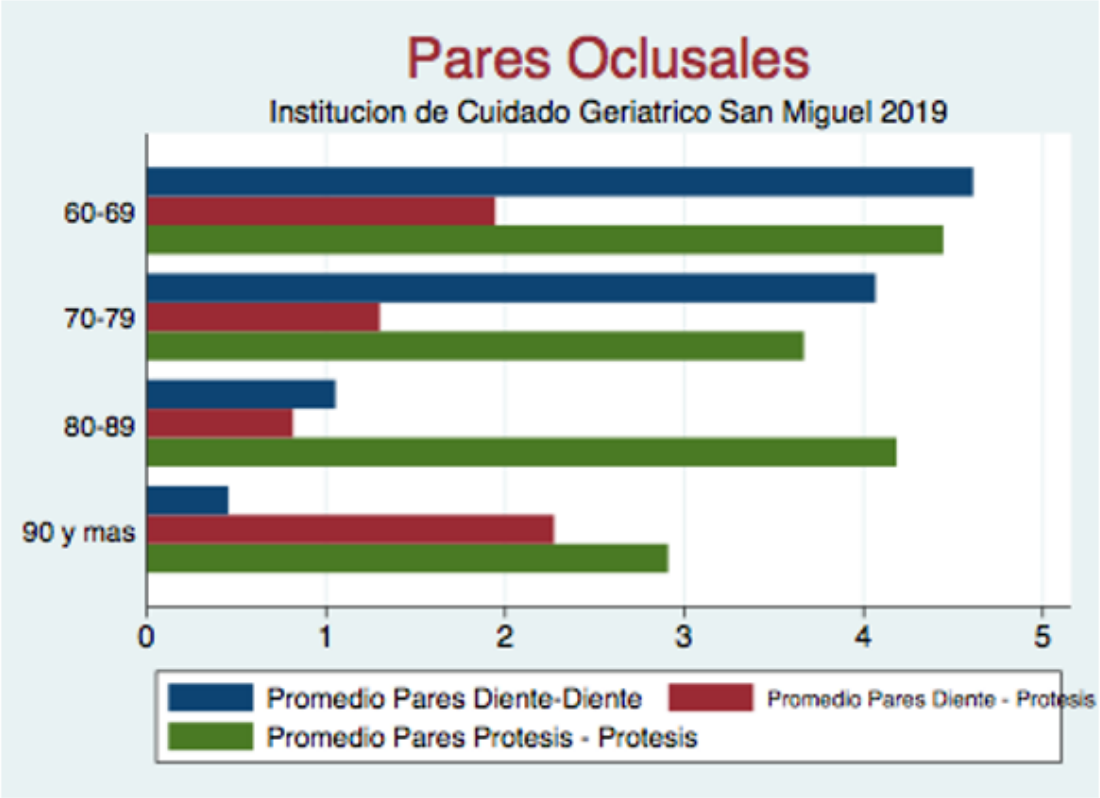

FIGURE 1
Occlusal Pairs by Age Group Blue bars show average pairs of tooth-to-tooth. Red bars are average pair of tooth-to-prosthesis. Green bars depict pairs of prosthesis-to-prosthesis.
Source: the authors.

DISCUSSION

The characterization performed in this study aimed at showing a problem that is already recognized around the world, but not much reported in Colombia. Therefore, responding to the need to fill the knowledge gap, a comprehensive assessment of the oral status of socioeconomically disadvantaged older adults residing in a senior care facility in the city of Cali is carried out. The data collection process had strengths such as the correct and standardized diagnosis by the examiners of the participants who accepted to be part of the study.

The population assessed showed different characteristics from other reports. In most senior care centers patients are mainly women, while in the HGASM the majority were men. This finding is similar to that of other national characterizations (27).

One of the main concepts that is discussed about the aging processes, in terms of the oral health status is edentulism, which is defined by the dictionary of prosthodontic terms as the absence or loss of teeth, which could be partial or complete (28). A recurrent finding among studies with population and institutionalized patients is the loss of teeth as age increases. That trend is evident in institutionalized groups of population (29), which was confirmed in this study. The participants presented entirely edentulous areas or complete edentulism.

The cleaning of prostheses at the senior care facility was found to be a common practice involving the use of toothpaste and toothbrush. Prostheses are mostly removable. Different techniques to perform hygiene can be adequate; however, depending on the case and the patient, differential interventions and practices

are necessary to establish appropriate behaviors (30). Dental hygiene plans should focus on preventing dental loss and promoting healthy behaviors contributing, this way, to conserve the oral structures, improve the masticatory function, maintain the occlusal pairs in an adequate manner, and for the elders to receive adequate training (31).

Generally, subprosthetic stomatitis is less common than what we found in this study, which is 12 %-13 % in other the populations (32). In Colombia, 40 % of seniors are reported to present stomatitis (20). In this study, the prevalence of stomatitis was 23 %, which makes it necessary to review and/or modify behaviors to reduce the occurrence of stomatitis, as well as controlling the increase of oral pathogens. The latter is associated with oral hygiene habits.

Important findings were related to the masticatory function, which is classified by the WHO as: Optimal, with the presence of 28 teeth, excluding third molars; adequate, between 24 and 27 teeth in the mouth; satisfactory, 20-23 teeth; minimum, 16-19 teeth; and non-functional, 15 teeth or less. In Colombia, as reported by the ENSAB IV, a total absence of teeth was found in 32 % of the population over 65 years of age, non-functional in 45 %, minimal in 8 %, functional in 3 % (20). This is important even when assessing chewing efficiency, which is determined by the number of chewing strokes required to split the food to be swallowed. Occlusal functionality findings in the study were similar to those reported of non-institutionalized populations. We expected to find a better chewing efficiency among participants in the study because of the access to dental care and their location in an urban area. These data allow to discard variables such as rurality and functionality when analyzing efficiency.

Regarding the average number of occlusal pairs, the general population in Colombia presents an average of 9.5 occlusal pairs, when considering natural and rehabilitated teeth (20). Among the patients of the HGASM, we found an average of eight pairs. This finding is slightly lower than the national average, which is interesting if we consider that these patients are socially vulnerable.

When analyzing the findings on oral health status of the seniors who participated in the study, there is a good amount of related literature to do comparisons. The surveillance of aspects such as edentulism, periodontal disease, dental caries has shown that those conditions are major causes of years of life lost due to disability and are highly correlated with an poor quality of life (33).

The older adult population, in general, who are in care centers or nursing homes, require a more adequate follow-up of oral health. There is an association between oral and dental conditions with systemic diseases such as hypertension, diabetes, and fragility (34,35). The occlusal forces, the number of teeth, and the age per se are associated with fragility (36). Oral frailty is even a predictor of systemic frailty conditions and a risk factor for early death (37).

Other systemic conditions that have been related to the oral health status include nutrition, poor oral hygiene, lack of teeth, inadequate chewing capacity, and xerostomia (38,39). The population in this study did not present a high prevalence of xerostomia; nevertheless, the other characteristics of nutritional deficiencies were present. On the other hand, edentulism and inadequate masticatory function are related to overweight or malnutrition among elderly people (40). The association of the oral health status of seniors with the quality of life has also been studied in the Colombian population (15).

This study documents the oral health status in population of seniors residing in care facilities. However, oral health should not be assessed away from systemic conditions. Therefore, health care approaches require new epistemological frameworks to understanding the relationship between the oral health and the general health of a person. Understanding oral health conditions from the point of view of complexity is essential to improving the understanding of general health. Likewise, narratives should go the focus on disease and include the perspective of primary health care, in the life cycle (41,42).

Public policy in Colombia requires the implementation of new inputs to promote better conditions among Colombian seniors and to create more awareness on the importance of oral health as a part of general health. This approach will contribute with a transversal way to control global disease. Colombia has worked on

reducing edentulism for 20 years; Nevertheless, there is still much work to be done (43). It is important to connect public policy with dental health professionals and technicians who are in charge of oral health care.

The discourse, even political, of geriatric oral health or dental geriatrics should reflect the concepts of society and self-care. Professionals treating the oral cavity should be engaged and learn about the positive concept of aging, which promotes a theoretical change of paradigm about active aging or healthy aging. They are necessary in the research and academic learning processes in dentistry. The change of paradigm should switch the focus from disease to health and embrace a concept of social participation in which gerontology as a discipline could play an essential role (44,45).

It is important to understand the characteristics of the aging population in Colombia and how their conditions and factors should or should not translate into risk for oral health conditions. In an institutionalized population, sociodemographic factors should not be risk factors for media-promoted edentulism that has been widely described in the literature (46-48). Perhaps, the history of dental floss use did play a transversal role in the oral conditions found in this study.

The results of this study are limited to the geriatric population of the care institution where it was conducted. It is necessary to generate broader evidence and to use more robust methodologies that allow statistical analysis in order to support more precise decisions and interventions for this group of population. New studies are required within the framework of the systemic relationship with this types of oral conditions. Frailty, nutrition, dementia, and functional aspects demand for specific questions about oral health. In addition, it is also necessary to understand the framework of quality of life that needs of more in-depth investigations, even considering situations associated with pandemics such as those experienced in the second decade of the twentieth century (46).

CONCLUSIONS

This study updates and provides an approximation on the oral health status in a population of older citizens residing in care facility in Cali, Colombia. We conducted a comprehensive analysis of occlusal pairs and masticatory function. The conditions found in the oral cavity of the participants call the attention on the importance and need for interventions in this type of population in Colombia.

RECOMMENDATIONS

In the future, the institutionalized elderly population in Colombia will require more analysis and approaches to uncover issues such as affections on quality of life from oral health conditions that occur among this institutionalized population. In addition, conducting analyzes of related general health conditions, including frailty and nutritional aspects, among institutionalized and non-institutionalized people are needed. Research on apprehension in dental care for older adults by patients and health professionals is also essential to understanding oral health conditions.

ACKNOWLEDGEMENTS

To the E.S.E Hospital Geriatrico y Ancianato San Miguel in Cali, Colombia, for the technical-logistical support and collaboration provided throughout the fieldwork. The oral characterization resulting from this study is valuable evidence for future interactions that result in health and well-being for the institutionalized older person.

References

1. United Nations. World population prospects. The 2000 revision. New York: UN; 2001
2. Organización Mundial de la Salud (OMS). Envejecimiento y salud. Ginebra, Suiza: OMS; 2021
3. Chackiel J. El envejecimiento de la población latinoamericana: ¿hacia una relación de dependencia favorable? In: Centro Latinoamericano y Caribeño de Demografía (CELADE). Encuentro Latinoamericano y Caribeño sobre las Personas de Edad; documentos de seminario técnico. Santiago, Chile: CELADE; 1999
4. Departamento Administrativo Nacional de Estadística (DANE). Censo nacional poblacional y vivienda Colombia. Bogota, Colombia: DANE; 2018
5. Ministerio de Salud y Protección Social (Minsalud). Envejecimiento demografico en Colombia 1951-2020 Dinámica Demográfica y estructuras poblacionales. Bogota, Colombia: Minsalud, Oficina de Promoción Social; 2013.
6. Organización Panamericana de salud (OPS/OMS). Decada de Envejecimiento Saludable 2020-2030. Washington D. C., Estados Unidos: OPS/OMS; 2020
7. Krout JA. Senior centers and services for the frail elderly. J Aging Soc Policy. 1995; 7(2): 59-76. https://doi.org/10.1300/j031v07n02_05
8. Pardasani M, Berkman C. New York City Senior Centers: Who Participates and Why? J Appl Gerontol. 2021 Sep; 40(9): 985-996. https://doi.org/10.1177/0733464820917304
9. Taylor-Harris D, Zhan HJ. The third-age African American seniors: benefits of participating in senior multipurpose facilities. J Gerontol Soc Work. 2011 May; 54(4): 351-71. https://doi.org/10.1080/01634372.2010.539588
10. Ministerio de Salud y Protección Social (Minsalud). Orientaciones para la prevención, contención y mitigación del Coronavirus (COVID-19) en centros de protección o larga estancia para personas mayores. Bogota, Colombia: Minsalud, Oficina de Promoción Social; 2013.
11. Gerritsen AE, Allen PF, Witter DJ, Bronkhorst EM, Creugers NH. Tooth loss and oral health-related quality of life: a systematic review and meta-analysis. Health Qual Life Outcomes. 2010 Nov 5; 8:126. https://doi.org/10.1186/1477-7525-8-126
12. Araujo de Lina CS, Silveira Moreira R. Factors associated with the presence of teeth in the adult and elderly Xukuru Indigenous Population in Ororubá; 2010. http://dx.doi.org/10.5772/59415
13. Ástvaldsdóttir Á, Boström AM, Davidson T, Gabre P, Gahnberg L, Sandborgh Englund G, Skott P, Ståhlnacke K, Tranaeus S, Wilhelmsson H, Wårdh I, Östlund P, Nilsson M. Oral health and dental care of older persons-A systematic map of systematic reviews. Gerodontology. 2018 Dec; 35(4): 290-304. https://doi.org/10.1111/ger.12368
14. Budtz-Jørgensen E, Chung JP, Rapin CH. Nutrition and oral health. Best Pract Res Clin Gastroenterol. 2001 Dec; 15(6): 885-896. https://doi.org/10.1053/bega.2001.0247
15. Gutiérrez Quiceno B, Calzada Gutiérrez MT, Fandiño-Losada A. Cultural adaptation and validation of the Geriatric Oral Health Assessment Index - GOHAI - Colombian version. Colomb Med (Cali). 2019 Jun 30; 50(2): 102-114. https://doi.org/10.25100/cm.v50i2.3999
16. Machado Luz FW, Silva AER, Perroni AP, Goettems ML, Boscato N. Impact of Seniors Centers on oral health-related quality of life of older adults. Rev Saude Publica. 2020 Jan 20; 54:07. https://doi.org/10.11606/s1518-8787.2020054001648
17. García-Alpízar B, Capote-Valladares M, Morales-Montes-de-Oca T. Prótesis totales y lesiones bucales en adultos mayores institucionalizados. Rev Finlay. 2012; 2(1):12
18. Bustilos-Ramirez L, Arellano-Gámez LA, Zambrano-Vergara R, Manoochehri-González A. Caries dental y lesiones bucales en adultos mayores institucionalizados en Merida- Venezuela. Rev Odontol de los Andes. 2015; 10(2): 19-24.

19. Rodas Avallaneda CP, Angarita Diaz MP, Nemocón Ramirez LF, Pinzón Castro LA, Robayo Herrera YT, González Sanchez R. Estado bucodental de adultos mayores Institucionalizado mediante un programa público en Villavicencio, durante el primer semestre de 2014. Rev Invest Andina. 2014; 18(33): 1625-1646.
20. Ministerio de Salud y Protección Social (Minsalud). IV estudio nacional de salud bucal (ENSAB). Bogotá, Colombia; 2014.
21. Ministerio de Salud y Protección Social, Departamento Administrativo de Ciencia Tecnología e Innovación (Colciencias), Universidad del Valle, Universidad de Caldas. Encuesta SABE Colombia: situación de salud, bienestar y envejecimiento en Colombia. Bogotá: Pregraf; 2016.
22. Díaz Cárdenas S, Arrieta Vergara K, Ramos Martinez K. Impacto de la Salud Oral en la Calidad de Vida de Adultos Mayores. Rev Clin Med Fam. 2012; 5(1): 9-16.
23. Charyeva OO, Altynbekov KD, Nysanova BZ. Kennedy classification and treatment options: a study of partially edentulous patients being treated in a specialized prosthetic clinic. J Prosthodont. 2012 Apr; 21(3): 177-180. https://doi.org/10.1111/j.1532-849X.2011.00809.x
24. Ekstrand KR, Gimenez T, Ferreira FR, Mendes FM, Braga MM. The International Caries Detection and Assessment System - ICDAS: A Systematic Review. Caries Res. 2018; 52(5): 406-419. https://doi.org/10.1159/000486429
25. Arendorf TM, Walker DM. Denture stomatitis: a review. J Oral Rehabil. 1987 May; 14(3): 217-227. https://doi.org/10.1111/j.1365-2842.1987.tb00713.x
26. McHugh ML. Interrater reliability: the kappa statistic. Biochem Med (Zagreb). 2012; 22(3): 276-82
27. Bermúdez W, Concha Sanchez S, Camargo Lemos D. Perfil orofacial de las personas mayores institucionalizadas de la ciudad de Bucaramanga y su área Metropolitana. Ustasalud. 2003; 2(1): 13-19. https://doi.org/https://doi.org/10.15332/us.v2i1.1849
28. The Glossary of Prosthodontic Terms: Ninth Edition. J Prosthet Dent. 2017 May; 117(5S): e1-e105. https://doi.org/10.1016/j.prosdent.2016.12.001
29. Chiu CT, Malhotra R, Tan SM, Lim J, Chan A, Teoh KH, Gan ST, Saito Y. Dental health status of community-dwelling older Singaporeans: findings from a nationally representative survey. Gerodontology. 2017 Mar; 34(1): 57-67. https://doi.org/10.1111/ger.12218
30. Papadiochou S, Polyzois G. Hygiene practices in removable prosthodontics: A systematic review. Int J Dent Hyg. 2018 May; 16(2): 179-201. https://doi.org/10.1111/idh.12323
31. Osmari D, Fraga S, Braun KO, Unfer B. Behaviour of the elderly with regard to hygiene procedures for and maintenance of removable dentures. Oral Health Prev Dent. 2016; 14(1):21-26. https://doi.org/10.3290/j.ohpd.a34051
32. Lynge Pedersen AM, Nauntofte B, Smidt D, Torpet LA. Oral mucosal lesions in older people: relation to salivary secretion, systemic diseases and medications. Oral Dis. 2015 Sep; 21(6): 721-729. https://doi.org/10.1111/odi.12337
33. Kassebaum NJ, Smith AGC, Bernabe E, Fleming TD, Reynolds AE, Vos T, et al. Global, regional, and national prevalence, incidence, and disability-adjusted life years for oral conditions for 195 countries, 1990-2015: a systematic analysis for the global burden of diseases, injuries, and risk factors. J Dent Res. 2017; 96(4): 380-387.
34. Shin HS. Association between the number of teeth and hypertension in a study based on 13,561 participants. J Periodontol. 2018 Apr; 89(4): 397-406. https://doi.org/10.1002/JPER.17-0413
35. Marengoni A, Angleman S, Melis R, Mangialasche F, Karp A, Garmen A, Meinow B, Fratiglioni L. Aging with multimorbidity: a systematic review of the literature. Ageing Res Rev. 2011 Sep; 10(4): 430-439. https://doi.org/10.1016/j.arr.2011.03.003
36. Watanabe Y, Hirano H, Arai H, Morishita S, Ohara Y, Edahiro A, Murakami M, Shimada H, Kikutani T, Suzuki T. Relationship between frailty and oral function in community-dwelling elderly adults. J Am Geriatr Soc. 2017 Jan; 65(1): 66-76. https://doi.org/10.1111/jgs.14355

37. Castrejón-Pérez RC, Borges-Yáñez SA, Gutiérrez-Robledo LM, Avila-Funes JA. Oral health conditions and frailty in Mexican community-dwelling elderly: a cross sectional analysis. BMC Public Health. 2012 Sep 12; 12: 773. https://doi.org/10.1186/1471-2458-12-773

38. Asakawa M, Takeshita T, Furuta M, Kageyama S, Takeuchi K, Hata J, Ninomiya T, Yamashita Y. Tongue Microbiota and oral health status in community-dwelling elderly adults. mSphere. 2018 Aug 15; 3(4): e00332-18. https://doi.org/10.1128/mSphere.00332-18

39. Kiesswetter E, Hengeveld LM, Keijser BJ, Volkert D, Visser M. Oral health determinants of incident malnutrition in community-dwelling older adults. J Dent. 2019 Jun; 85: 73-80. https://doi.org/10.1016/j.jdent.2019.05.017

40. De Marchi RJ, Hugo FN, Hilgert JB, Padilha DM. Association between number of teeth, edentulism and use of dentures with percentage body fat in south Brazilian community-dwelling older people. Gerodontology. 2012 Jun; 29(2): e69-76. https://doi.org/10.1111/j.1741-2358.2010.00411.x

41. Gupta A, Keuskamp D. Use and misuse of mixed methods in population oral health research: A scoping review. Community Dent Health. 2018 May 30; 35(2): 109-118. https://doi.org/10.1922/CDH_4250Gupta10

42. Gutiérrez Quiceno B, Luis Alejandro Gómez Barrera LA. Una revisión de alcance de la ciencia de la complejidad en odontología. Hipotesis de Dent. 2021; 12: 109-117

43. Kassebaum NJ, Bernabé E, Dahiya M, Bhandari B, Murray CJ, Marcenes W. Global burden of severe tooth loss: a systematic review and meta-analysis. J Dent Res. 2014 Jul; 93(7 Suppl):20S-28S. https://doi.org/10.1177/0022034514537828

44. World Health Organization (WHO). Active ageing: a policy framework. Geneva, Switzerland: WHO; 2015

45. Holstein MB, Minkler M. Self, society, and the "new gerontology". Gerontologist. 2003 Dec; 43(6): 787-96. https://doi.org/10.1093/geront/43.6.787

46. Quiceno Gutie#rrez B, Perdomo A. El reto del ejercicio odontológico en el marco de la pandemia y futuro post COVID-19: Una Reflexión Desde La Salud Pública. Salutem Scientia Spiritus. 2020; 6(1)

47. Roberto LL, Crespo TS, Monteiro-Junior RS, Martins AMEBL, De Paula AMB, Ferreira EF, Haikal DS. Sociodemographic determinants of edentulism in the elderly population: A systematic review and meta-analysis. Gerodontology. 2019 Dec; 36(4): 325-337. https://doi.org/10.1111/ger.12430

48. Peltzer K, Hewlett S, Yawson AE, Moynihan P, Preet R, Wu F, Guo G, Arokiasamy P, Snodgrass JJ, Chatterji S, Engelstad ME, Kowal P. Prevalence of loss of all teeth (edentulism) and associated factors in older adults in China, Ghana, India, Mexico, Russia and South Africa. Int J Environ Res Public Health. 2014 Oct 30; 11(11): 11308-11324. https://doi.org/10.3390/ijerph111111308

Notes

* Original research.

How to cite this article: Ordóñez Realpe MA, Benavidez Palacios CA, Gómez Córdoba CY, Calzada Gutiérrez MT, Gutiérrez Quiceno B. Oral Conditions, Occlusal Pairs, and Masticatory Function of Institutionalized Older People in Cali Colombia, 2019Univ Odontol. 2022; 41. https://doi.org/10.11144/Javeriana.uo41.ocop